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Antimalarial and Antioxidant Activities of Isoprenylated Coumarins from the Stem Bark of *Mesua borneensis* L.

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Abstract: The aim of this study was to assess the antimalarial and antioxidant effects of the *n*-hexane and ethyl acetate extracts together with three isolated isoprenylated coumarins, mammea A/BA(**1**),mammea A/AA cyclo D **(2)** and mesuol **(3)** from the stem bark of *M. borneensis* L. The *n*-hexane and ethyl acetate extracts, as well as compounds **1-3** were evaluated for their antimalarial activity against *Plasmodium falciparum* strain 3D7 (chloroquine-sensitive) and their antioxidant activity against DPPH radical scavenging. Compound **2** exhibited slightly more active than chloroquine. Compounds **1** and **3** showed very high activity against DPPH radical.

Key words: Isoprenylated coumarin, *Mesua borneensis* L., Antimalarial, Antioxidant.

Introduction

Malaria is a major cause of death in the word caused by a protozoan of the genus *Plasmodium* and transmitted by *Anopheles* mosquito vectors, especially in tropical developing countries. This disease has been found endemic at all of region in Indonesia. Recently, chloroquine and artemisinin have been used as antimalarial drugs and showed resistance against *Plasmodium* parasites in Indonesia. *Mesua* belongs to the family Calophyllaceae. This plant has produced a number of secondary metabolites such as coumarins, flavonoids, xanthones, and terpenoids that showed biological activities as anticancer, antioxidant, antimicrobial and antimalarial [1,2,3,4]. Based on ethno-botanical survey, the aqueous decoction from the stem bark or leaves of *M. borneensis* L. has been used in the Dayak people as malaria traditional medicine. Literature survey revealed that the extracts and the isolated compounds of isoprenylated coumarins from *Mesua borneensis* L. have not yet reported for their antimalarial and antioxidant activities. In continuation of our phytochemical work of Indonesian tropical plants aiming to find new antimalarial and antioxidant activities from *M. borneensis* L., this study focused on the structure-activity relationship of the antimalarial toward *Plasmodium palcifarum* strain 3D7 (chloroquine-sensitive) and antioxidant effects toward DPPH radical from the *n*-hexane and ethyl acetate extracts, mammea A/BA (**1**), mammea A/AA cyclo D **(2)** and mesuol **(3)** from the stem bark of *M. borneensis* L.

Materials and methods

Plants material

The stem bark of *M. borneensis* L. were collected in August 2014 from the conserved forest of Bukit Bangkirai, Semboja, East Kalimantan, Indonesia. The plant was identified at the Herbarium Bogoriense, Bogor Botanical Garden, Bogor, Indonesia.

Extraction and isolation

The dried powder of stem barks of *M. borneensis* L. (3.0 kg) were macerated in metha-

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